

REMARKS

This Response seeks to place this reissue application in condition for allowance. Claims 1-62 are pending. Some of the pending claims have been amended. The rejections to the pending claims have been addressed below. No new matter has been added.

Although not required, for the convenience of the Examiner, Applicants have provided in Appendix A, a version of the claims with marking to show deletions and insertions to the claims relative to the previous amendment.

OFFICE ACTION

In the Office Action mailed January 8, 2003 (hereinafter, the "OFFICE ACTION"), claims 18-39 were rejected under 35 USC 112, second paragraph as being indefinite and all of the pending claims were rejected under 35 USC 103(a) as being "unpatentable over Grabbe in view of Uberbacher, Goodman, Ritchie, Canning, Inacker, Thompson, Goshorn" (OFFICE ACTION, page 2). These rejections are addressed below.

35 U.S.C. 112 Rejection

In the OFFICE ACTION, Claims 18-39 were rejected under 35 U.S.C. 112, second paragraph as being indefinite. To address the Examiner's concern, applicants have amended claim 18 to clarify, among other things, that a first group of conductor lines is interleaved with a second group of conductor lines, wherein the second group of conductor lines includes a number of electrical contact elements being adapted to couple to a ground plane node of the substrate. Claims which depend from claim 18 have been amended to be consistent with the base claim and/or to provide improved

clarity. Support for these amendments may be found, for example, on page 12, line 15 to page 13, line 19, and Figures 3A and 3B. No new matter has been added.

35 U.S.C. 103(a) Rejection

In the OFFICE ACTION, all of the pending claims were rejected under 35 U.S.C. 103(a) as being "unpatentable over Grabbe in view of Uberbacher, Goodman, Ritchie, Canning, Inacker, Thompson, Goshorn" (OFFICE ACTION, page 2). Applicants respectfully submit that the pending claims are not obvious in view of any combination of these references.

The discussion pertaining to the 35 U.S.C. 103(a) rejection provided on pages 2-3 of the OFFICE ACTION does not address specific claim limitations of any of the pending claims. To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art¹.

Without knowing how specific claim limitations map to specific subject matter disclosed in the references relied upon for the 35 U.S.C. 103 rejection, and what basis² is being given for the rejection to such claims, Applicants are unable to properly address the 35 U.S.C. 103 rejection. However, for completeness, below Applicants make an attempt at addressing independent claims 1, 18, 40 and 47 in view of the obviousness rejection.

1 In re Royka, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). "All words of a claim must be considered in judging the patentability of that claim against the prior art." (See also MPEP 2143.03).

2 The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to the obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning why the artisan would have found the claimed invention in light of the teachings of the references" Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Although not separately addressed herein, dependent claims 2-17, 19-39, 41-46, and 48-62 incorporate limitations that present patentable subject matter in their own right³. In short, these limitations are also not obvious in view of the aforementioned rejections. No inference or conclusion of any kind should be drawn from the absence of comments pertaining to other limitations or elements, whether those limitations or elements are contained in independent or dependent claims.

Finally, Applicants believe that the statements made on page 3 of the OFFICE ACTION, to the extent understood, are ambiguous and may be misconstrued and, as such, are incomplete. No inference or conclusion of any kind should be drawn from the absence of comments pertaining to these statements. Applicants respectfully submit that the claims of the instant application, individually or in combination with other claims (via dependency), describe the patentable subject matter of Applicants' invention(s). Accordingly, the statements made on page 3 of the OFFICE ACTION in no way bind or affect the interpretation, infringement, validity and/or enforceability of any claim(s) or patent(s) resulting from, or relating to this application.

Claim 18 is not Obvious

Applicants submit that claim 18 (in its amended or pre-amended form) is not obvious. Claim 18 is directed towards a socket for providing an electrical interface between a substrate and a plurality of removable electronic components and as amended, recites in part:

3 If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious, In re fine, 837 F.2d 1071, 5USPQ2d 1596 (Fed. Cir. 1988).

a first group of conductor lines interleaved with a second group of conductor lines, wherein the first group of conductor lines includes a first signal conductor extending through the socket housing and having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate such that the first signal conductor forms a signal transmission line between the first and second traces.... and wherein the second group of conductor lines includes a number of electrical contact elements disposed along the length of each conductor line of the second group of conductor lines, the number of electrical contact elements being adapted to couple to a ground plane node of the substrate.

Applicants submit that Grabbe in view of Uberbacher, Goodman, Ritchie, Canning, Inacker, Thompson, Goshorn (or any combination thereof, hereinafter, the "CITED REFERENCES") does not render claim 18 obvious. These references, alone or in any combination, do not describe, motivate or suggest, as recited in claim 18, a socket having a first group of conductor lines interleaved with a second group of conductor lines that include a number of electrical contact elements to couple to a ground plane node of the substrate the first group of conductor lines including a first signal line having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate such that the first signal line forms a signal transmission line between the first and second traces. Ritchie addresses the problem of interconnecting printed circuit boards in parallel, Grabbe addresses the need for connecting a semiconductor device to a substrate, while Goshorn addresses the problem of forming adequate power bussing on a printed circuit board. It would be counterintuitive to combine Grabbe with Ritchie and/or Goshorn for several reasons.

For example, claim 18 in part, includes the limitations of "a substrate", and "a first signal conductor extending through the socket housing and having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate". Grabbe teaches the approach of soldering each "element 10" to a "conductive circuit 84 on substrate

86" (col. 2, lines 30-33), while Ritchie teaches away and disclaims the need for any such substrate. In fact, Ritchie teaches away from coupling signal lines of a socket to any substrate whatsoever and advocates a single or double sided bussing connector that includes an integrated internal bus so that no connection to a substrate is needed. Ritchie, in the background section, mentions a conventional system where "using standard edge board connectors [a] bus would be carried through the motherboard or backplane and the individual daughter boards connected thereto"⁴, and that this approach would have "the significant disadvantage of being rather costly due to the large number of parts necessary to effect proper interconnection."⁵ Thus, Ritchie disclaims the conventional approach of connecting the socket to a motherboard, as is taught in Grabbe, and avoids using a motherboard altogether.

In addition Grabbe, to the extent understood, teaches away from the approach of having a "predetermined impedance" as is recited in claim 18. Grabbe, teaches the approach of soldering each "element 10" to a "conductive circuit 84" (see Grabbe, Fig. 5). The element 10 of Grabbe incorporates a scalloped soldering approach to "electrically and mechanically" secure the circuit to the substrate 86 which results in (uncontrolled) impedance variance where base 12 of element 10 meets the substrate 84. That is, Grabbe discloses that each contact element 10 (which receives a compliant portion of a circuit board), has its own solder connection to a printed circuit board base, see col. 2 of Grabbe, i.e.,

Base 12 of element 10 extends below housing 50 and is electrically and mechanically secured to circuit 84 by solder 88. As shown, solder 88 fills scallops 28 so that within each scallop there is a substantially thicker layer of solder which is capable of absorbing more deformation before fracturing.

4 See Ritchie, col. 1, lines 30-33.

5 See Ritchie, col. 1, lines 42-45.

As such, Grabbe is completely at odds with Ritchie. In contrast, Ritchie incorporates the approach of "bonding strips of insulation 114, 116 on opposite sides of insulation 114, 116 on opposite sides of carrier portion 96 of the terminal strip 92 and a layer of metallization 118, 120 on the outside of the insulation"⁶. Such an approach as adopted in Ritchie could not be used in Grabbe.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions which would lead away from the claimed invention⁷. Grabbe teaches away from the approach of controlling impedance in view of providing stability, while Ritchie teaches away from the approach of a socket which is adapted for coupling to a substrate, e.g., a motherboard. Thus, there is no suggestion or motivation, to combine Grabbe with Ritchie.

Furthermore, it would be counterintuitive to combine Grabbe with Ritchie and/or Goshorn and demonstrate that such a combination includes all of the claim limitations of claim 18. Goshorn issued over 30 years ago and is directed to a printed circuit board ("PCB") having "elevated bus bars". Such bus bars merely power and ground conductors which are elevated to overcome problems, encountered in the late 60's, with etching such conductors directly onto the surface of the PCB. The bus bars disclosed in Goshorn serve to distribute power (or signal bussing) to circuit components on the board, and have nothing to do with a socket for providing an electrical interface between a substrate and a plurality of removable electronic components, i.e., see Goshorn col. 5, lines 33-40:

6 See Ritchie, col. 4, lines 31-34 and Figures 8 and 9.

7 (see W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984), see also MPEP 2141.02)

The principal use of the elevated bus bars of the present invention is to distribute power to the circuit components on the board, and for this reason the accompanying drawings illustrate the bus bars as power distribution conductors. Nevertheless, the elevated bus bars of the invention may also be employed for other purposes, as for example, bussing where a high current signal is to be conducted.

As such, Goshorn includes no disclosure or mention of any socket whatsoever, for providing an electrical interface between a substrate and a plurality of removable electronic components. While Goshorn mentions that the "bus bars" may be employed for other purposes, it is unclear and counterintuitive how such bus bars could be combined with what is disclosed in Grabbe, which again, teaches the approach of soldering the base 12 of each element 10 to circuit 84 on substrate 86 (see Grabbe col. 2, lines 28-49). The type of PCB disclosed in Goshorn is clearly incompatible with the more contemporary printed circuit board technology disclosed in Grabbe (The PCB technologies of Grabbe and Goshorn are more than 20 years apart). In addition, it is not clear how "elevated bus bars" as described in Goshorn could be combined with Ritchie, which disclaims the approach of connecting the socket to a motherboard (and avoids using a motherboard altogether). There simply is no motivation or suggestion to combine any aspect of Goshorn with Grabbe or Ritchie given within these respective documents. The teaching or suggestion to make the claimed combination may not be based on applicant's own disclosure⁸.

Thus, Applicants submit that Grabbe in view of Uberbacher, Goodman, Ritchie, Canning, Inacker, Thompson, Goshorn do not render claim 18 obvious, since none of these references, in combination, describe, motivate, suggest or teach, as recited in claim 18, a socket having a first group of conductor lines interleaved with a second group of conductor lines that include a number of

⁸ (see in re Vaack, 947 F.2d488, 20 USPQ2d 1438 (Fed. Cir. 1991))

electrical contact elements to couple to a ground plane node of the substrate. In addition, no combination of the CITED REFERENCES suggest, motivate or teach such a socket including a first signal line having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate such that the first signal line forms a signal transmission line between the first and second traces.

Claim 1 is not Obvious

Applicants submit that, for at least the same reasons as is recited above with respect to claim 18, claim 1 is not rendered obvious in view of the CITED REFERENCES.

Claim 1, (as amended) is directed to an electrical connector and recites in part:

each bus conductor of the first group is positioned in an interleaved configuration with each bus conductor of the second group and having a predetermined transmission line impedance, and wherein each of the bus conductors of the first group are adapted to be electrically coupled to respective signal paths associated with a circuit board on which the connector is to be mounted through an electrical contact element disposed substantially near each end of each respective bus conductor of the first group, and the bus conductors of the second group each being adapted to be electrically coupled to an electrical ground plane associated with the circuit board through a number of electrical contact elements disposed along each bus conductor of the second group.

At the very least, the CITED REFERENCES, alone or in combination do not render the above mentioned claim limitations obvious, since none of these references, alone or in combination, describe, motivate or suggest an electrical connector that includes bus conductors of a first group having a predetermined transmission line impedance, and adapted to be electrically coupled to respective signal paths associated with a circuit board on which the connector is to be mounted through an electrical contact element disposed substantially near each end of each respective bus

conductor of the first group. Furthermore none of the CITED REFERENCES, in combination motivate or suggest the connector as recited in claim 1 including the bus conductors of the second group each being adapted to be electrically coupled to an electrical ground plane associated with the circuit board through a number of electrical contact elements disposed along each bus conductor of the second group.

Claim 40 is not Obvious

Applicants submit that, for at least the same reason as is recited above with respect to claim 18, claim 40 is not rendered obvious in view of the CITED REFERENCES. Claim 40, is directed to an electrical connector and recites, in part:

signal conductors that extend through the connector housing to form a signaling bus... each of the signal conductors having first and second ends to couple to respective signal traces on a substrate and having a predetermined impedance; and
ground conductors that extend through the connector housing parallel to and interleaved with the signal conductors, the ground conductors each including a plurality of contact regions to electrically couple to a ground reference of the substrate, the ground conductors and signal conductors being disposed within the connector housing such that each of the signal conductors is adjacent at least one of the ground conductors.

At the very least, the CITED REFERENCES, alone or in combination do not render the above mentioned claim limitations obvious, since none of these references, describe, motivate or suggest an electrical connector including, among other things, signal conductors having first and second ends to couple to respective signal traces on a substrate and having a predetermined impedance, and ground conductors each including a plurality of contact regions to electrically couple to a ground reference of the substrate.

Claim 47 is not Obvious

Applicants submit that, for at least the same reason as is recited above with respect to claim 18, claim 47 is not rendered obvious in view of the CITED REFERENCES. Claim 47 is directed to a signaling system and recites in part:

a plurality of signal conductors... each signal conductor of the plurality of signal conductors having a predetermined impedance and being coupled to form a transmission line between a respective one of the first plurality of signal conducting traces on the substrate and a respective one of the second plurality of signal conducting traces on the substrate, and wherein the plurality of signal conductors include a group of signaling lines that are interleaved with a group of ground lines, each ground line of the group of ground lines including a plurality of electrical contact elements electrically coupled to a ground plane;

At the very least, the cited references, alone or in combination does not render the above mentioned claim limitations obvious, since none of these references describe, motivate or suggest signaling system including a plurality of signal conductors, each signal conductor of the plurality of signal conductors having a predetermined impedance and being coupled to form a transmission line between a respective one of the first plurality of signal conducting traces on the substrate and a respective one of the second plurality of signal conducting traces on the substrate, and a group of signaling lines that are interleaved with a group of ground lines, each ground line of the group of ground lines including a plurality of electrical contact elements electrically coupled to a ground plane.

Information Disclosure Statement

Being mailed (due to the voluminous number of pages) concurrently herewith is an information disclosure statement citation form PTO-1449 (modified) along with a copy of the document titled "RAMBUS CHANNEL DESIGN GUIDE", listed thereon. A copy of the PTO-1449 is attached hereto.

Conclusion

Applicants request reconsideration of the instant application in view of the foregoing remarks and amendments. Applicants submit that the pending claims present patentable subject matter. Accordingly, allowance of all of the claims is respectfully requested.

Respectfully submitted,



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Appendix A: Version of the Reissue Claims with Markings to show Amendments
made with respect to the most Previous Amendment

18. (Twice Amended) A socket for providing an electrical interface between a substrate and a plurality of removable electronic components, the socket comprising:
a socket housing adapted to receive the plurality of removable electronic components; and
[a plurality of signal lines including] a first group of [signal] conductor lines interleaved with a second group of [signal] conductor lines, wherein the first group of [signal] conductor lines includes a first signal conductor extending through the socket housing and having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate such that the first signal conductor forms a signal transmission line between the first and second traces, the first signal conductor further having a plurality of electrical contact regions to couple to counterpart electrical contact regions disposed on the plurality of removable electronic components, and wherein the second group of [signal] conductor lines includes a number of electrical contact elements disposed along the length of each [signal] conductor line of the second group of [signal] conductor lines, [each] the number of electrical contact elements being adapted to couple to a ground plane node of the substrate.
19. (Amended) The socket of claim 18 wherein additional signal conductors [lines] of the first group of [signal] conductor lines extend through the socket housing parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each of the additional signal conductors form[s] a signal transmission line between the additional pair of traces, each of the additional signal conductors further having a plurality of electrical contact regions to couple to additional counterpart electrical contact regions disposed on the plurality of removable electronic components, the first signal conductor and the additional signal conductors forming a signaling bus that extends through the socket housing.

20. (Twice Amended) The socket of claim 18 wherein the second group of [signal] conductor lines includes a first ground conductor extending through the socket housing and disposed adjacent the first signal conductor, the first ground conductor having a plurality of contact elements disposed along its length to couple the first ground conductor to the ground plane of the substrate.
21. (Twice Amended) The socket of claim 20 wherein the first group of [signal] conductor lines include:
additional signal conductors extending through the socket housing in a direction parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each of the additional signal conductors form[s] a signal transmission line between the respective additional pair of traces, each of the additional signal conductors further having a plurality of electrical contact regions to couple respectively to additional counterpart electrical contact regions disposed on the plurality of removable electronic components, the first signal conductor and the additional signal conductors forming a signaling bus that extends through the socket housing;
wherein the second group of [signal] conductor lines include additional ground conductors extending through the socket housing parallel to the first ground conductor, each of the additional ground conductors having a plurality of contact elements located along its length to couple to a ground plane of the substrate; and
wherein signal conductors, including the first signal conductor and the additional signal conductors, and ground conductors, including the first ground conductor and the additional ground conductors, are disposed within the socket housing such that each of the signal conductors is adjacent a respective one of the ground conductors.
23. (Amended) The socket of claim 21 wherein the signal conductors and the ground conductors are disposed within the socket housing such that each [of] signal conductor of a subset of the signal conductors is positioned between a respective pair of the ground conductors.

33. (Twice Amended) The socket of claim 18 wherein [the] additional signal conductors of the first group of conductor lines extend through the socket housing parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each additional signal conductor forms a signal transmission line between the additional pair of traces, each additional signal conductor further having a plurality of electrical contact regions to couple to additional counterpart electrical contact regions on the plurality of removable electronic components; and wherein the socket further comprises a plurality of elastomers extending through the socket housing in a direction transverse to the first signal conductor and the additional signal conductors, each of the elastomers extending beneath at least one electrical contact region of each of the additional signal conductors and beneath at least one electrical contact region of the first signal conductor.